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PRELIMINARY REGULATORY EVALUATION, INITIAL REGULATORY FLEXIBILITY DETERMINATION, TRADE IMPACT ASSESSMENT, AND UNFUNDED MANDATES ASSESSMENT

FOR

SUPPLEMENTAL NOTICE OF PROPOSED RULEMAKING:

IMPROVED SEATS in AIR CARRIER TRANSPORT CATEGORY AIRPLANES

OFFICE OF AVIATION POLICY AND PLANS
AIRCRAFT REGULATORY ANALYSIS BRANCH, APO-320

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Regulatory Evaluation of Supplemental Notice of Proposed Rulemaking (SNPRM): Improved Seats in Air Carrier Transport Category Airplanes

I. Introduction

This economic analysis evaluates the Federal Aviation Administration (FAA)'s new proposal (i.e., the SNPRM) to require the retrofit of improved seats in transport category airplanes. A notice of proposed rulemaking (NPRM) was published on May 17, 1988, that proposed requiring more crashworthy seats on transport category airplanes used in passenger and cargo-carrying operations and in scheduled intrastate service. Following concerns expressed by industry in their comments on the NPRM, the FAA conducted a public meeting in 1998 in Washington, D.C., for the purpose of revising the 1988 proposal; two of the changes proposed involved excluding from the requirements all-cargo operations aa well as part 135 airplane operations (see next section for further details). This proposal differs in some respects from the 1988 and 1998 proposals. The FAA has narrowed the focus of its proposal to address only the crashworthiness of passenger and flight attendant seats on transport category airplanes used in passenger-carrying domestic, flag, and supplemental operations. This rulemaking is intended to increase passenger and flight attendant protection and survivability in impact-survivable accidents.

The economic evaluation of this Rulemaking is based primarily on a November 2000 study titled "Improved Seats in Transport Category Airplanes: Analysis of Options," prepared by Greg Won, a former staff member of FAA's Office of System Safety (ASY). The study, which is included in the Docket for this rulemaking, evaluated costs and benefits for the period 2000-2020 (although the final rule probably would not be implemented before 2003, the

benefit/cost relationship would essentially be the same). A modified option 5 of that analysis is the basis of the new requirements proposed in this SNPRM. The SNPRM incorporates a 14-year deadline date beyond which all airplanes must be in compliance; as a result, the cost/benefit data in this analysis differ somewhat from option 5 in the study cited. The study has been placed in FAA's docket file associated with this rulemaking. [The report is hereinafter referred to as the ASY 16g-seat options study, or in short, the ASY 16g-seat study. Besides the 14-year deadline date for compliance, the subject evaluation differs from the ASY 16g-seat study in that it uses $3 million for a fatality averted (vs. $2.7 million).

II. Background

Original 1988 NPRM and 1998 proposal

Title III, section 303(b), of the Airport and Airway Safety and Capacity Expansion Act of 1987 (Act of 1987) requires the Secretary of Transportation to initiate rulemaking to consider requiring all seats onboard all air carrier aircraft to meet improved crashworthiness standards based on the best available testing standards for crashworthiness. On May 17, 1988, the FAA published Notice No. 88-8, Retrofit of Improved Seats In Air Carrier Transport Category Airplanes; Notice of Proposed Rulemaking (53 FR 17650), to require all seats of transport category airplanes operated under part 121 and part 135 of Title 14, Code of Federal Regulations (14 CFR) to comply with improved crashworthiness standards. The NPRM proposed to prohibit the operation of these airplanes unless all seats met the crashworthiness performance standards for newly type-certificated airplanes required by

Amendment No. 25-64, Improved Seat Safety Standards; Final Rule (53 FR 17640, May 17, 1988).

Amendment No. 25-64 upgraded the standards for occupant protection during emergency landing conditions in transport category airplanes. Based on research, testing, and service experience, the amendment revised the seat and restraint system requirements and defined occupant injury criteria for impact conditions. The improved seating systems provide increased occupant protection in airplanes involved in impact-survivable accidents.

Part of the FAA's recurrent interest in getting relevant information on 16g dynamic seats was met by holding a public meeting on October 23 and 24 of 1995 in Seattle, Washington. That meeting was used to present the FAA's views and to listen to comments from the aviation community and information gained during this meeting led the FAA to reconsider the original rule proposed in NPRM 88-8.

During the late 1990s, industry and the FAA were still addressing significant 16g seat issues. However, 16g seats were being produced and certificated on a regular basis. Therefore, the FAA believed it was appropriate to hold another public meeting and to move forward with its rulemaking to improve seats on aircraft. Therefore, at the 1998 public meeting, the FAA proposed revising its 1988 proposal to only add a new paragraph to § 121.311 that would prohibit the operation of each transport category airplane type-certificated after January 1, 1958, unless all passenger and flight attendant (hereinafter, "FA") seats in the airplane fully comply with the requirements of § 25.562. The FAA indicated it was considering an exception for airplanes

operated in all-cargo operations. The proposed requirements would be effective 4 years after publication of a final rule, which would be approximately January 2003.

The FAA also proposed an alternative to be contained in another paragraph in § 121.311 that would allow a transport category airplane type-certificated after January 1, 1958, to continue to be operated after 4 years after the publication of a final rule provided all passenger and FA seats comply with § 25.562 or are properly marked as 16g-compatible. The FAA stated a seat could properly be marked as 16g-compatible if it was manufactured before the 4-year compliance date and underwent a supplemental certification. Under the 1998 proposed revisions, an applicant for a 16g-compatible seat would be required to show that the seat or seat type would withstand the dynamic loads set forth in § 25.562(a) and (b) without structural separation of the seat's primary structure. The applicant also would have had to demonstrate that the occupant dummy remained in the seat during the test and would not be entrapped by the test article. In addition, the FAA indicated it would not require the retrofit of seats of aircraft operated under part 135.

Much of the discussion at the public meeting addressed the meaning of 16g-compatible and the process for establishing compatibility. Industry expressed concern about the FAA's ability to handle increased certification projects and the seat manufacturers' ability to produce enough seats in 4 years to meet the other requirements of the proposal. Furthermore, industry criticized the FAA data used to support the safety benefits of the proposal as outdated and argued that the number of potential lives saved would not warrant the costs associated with the proposal. In addition, comments

presented at the public meeting addressed the expense associated with previously adopted regulations addressing accident prevention. Industry also urged that regulatory requirements involving significant costs should be focused on accident prevention rather than aircraft crashworthiness. Finally, industry urged that air carriers be permitted to replace existing seats with upgraded seats based on business needs rather than a regulatory mandate.

In addition to comments offered at the public meeting, the FAA reopened the docket for comments through January 8, 1999. The FAA received approximately 40 additional comments by the close of this comment period. The commenters generally opposed certain aspects of the proposal. The substance of these comments are discussed in this SNPRM under the section titled New Proposal.

Based on the comments received in response to Notice No. 88-8 and the 1998 public meeting[s] as well as new survivable accident data and cost-benefit analyses developed following the 1998 public meeting, the FAA has determined that it is appropriate to modify Notice No. 88-8 and the proposal made at the 1998 public meeting, and issue an SNPRM.

Specifics of New Proposal (SNPRM)

This new proposal evolved from many that were developed since the 1998 Public Meeting. The FAA carefully considered the viewpoints that were presented at that meeting and believes this proposal will provide the best solution for upgrading the entire fleet of part 121 transport category airplanes with safer seats in a reasonable timeframe. The proposals developed explored a

wide range of options toward seat replacement on existing aircraft that ranged from voluntary replacement to mandatory replacement under several different timeframes for compliance. Evaluations included giving credit for certain era seats that are believed to be compliant to some part of § 25.562. The degree to which the replacement seats would have to comply with the 16g standard, or § 25.562, was also evaluated. The problems associated with "16-g compatible" seats presented at the 1998 Public Meeting has been remedied in this proposal by ensuring one level of safety that requires full compliance with § 25.562. This proposal also eliminates the need for re-certification of existing seats already installed on aircraft that would have been required under 16g-compatibility. Many rulemaking proposals were evaluated that would have required seats in existing aircraft to be replaced per a fixed accelerated schedule; however the FAA believes that replacement of the seats based on current business practices will effectively update the existing fleet and allow the airlines flexibility in achieving this goal. However, the proposal does impose a future deadline for ultimate replacements of all seats not meeting the requirements of § 25.562.

As delineated in the 16g-seat study cited earlier, the FAA examined five options to improve seats in transport category airplanes operating under 14 CFR part 121. Option 1 involved ongoing surveillance only, with no regulatory action. This option would not require full or partial 16g seats[1] in new or in-service airplanes, but could include continued seat testing programs as well as ongoing surveillance of the industry to monitor installed

[1] "Full 16g" refers to seat installations that comply with 14 CFR §25.562 (a), (b), and (c). "Partial 16g" refers to seat installations that meet 16g structural loading requirements but have not been certificated as compliant with some or all occupant injury requirements in 14 CFR §25.562 (c).

seat types. Option 2 required full 16g seats in newly manufactured airplanes by 2005, i.e., all newly manufactured transport category airplanes operating under 14 CFR part 121 would comply with the requirements of 14 CFR § 25.562(a), (b), and (c). Option 3 required full 16g seats in newly manufactured airplanes by 2005 and partial 16g seats in all in-service airplanes operating under part 121 by 2005. In addition to the requirements of Option 2, this option required that seats in in-service airplanes (that is, airplanes manufactured before 2005) meet 14 CFR § 25.562(a), (b), and (c) excluding head injury criteria. Option 4 required full 16g seats in newly manufactured airplanes by 2005 and discretionary replacement with partial 16g seats by 2005 for other in-service part 121 airplanes. In addition to the requirements of Option 2, this option required that when seats in in-service airplanes are replaced (at the discretion of the operator/owner) they must be replaced with seats that meet 14 CFR §25.562(a), (b), and (c) excluding head injury criteria. Option 5 required full 16g seats in newly manufactured airplanes by 2005 and discretionary replacement with full 16g seats by 2005 for other in-service part 121 airplanes. In addition to the requirements of Option 2, this option required that when seats in in-service airplanes are replaced (at the discretion of the operator/owner) they must be replaced with seats that meet 14 CFR §25.562(a), (b), and (c).

For each option, benefits and costs were computed separately for passenger seats and cabin attendant seats. Each option was evaluated in terms of four "decision factors": (1)- what would the underlying rate of accidents, injuries, and fatalities be during the forecast period? (For example, even if the difference in performance between 16g seats and non-16g seats is very large, if the future accident rate is very low, a 16g-seat requirement may

not be cost-beneficial);(2)- how does each option affect the future distribution of seat types in the part 121 fleet? (For example, if industry trends are such that a given option will have very little effect on the future distribution of seat types, then a requirement based on that option may not be cost beneficial);(3)- to what degree do different vintages of full 16g and partial 16g seats reduce the risks of injuries and fatalities? (For example, if there is little practical difference between full 16g seats and current generation seats, then a requirement for full 16g seats may not be cost-beneficial); (4)- what are the net costs of each option?

After detailed consideration of all five options described above, both in the context of the regulatory issues delineated and the economic/safety concerns implicit in FAA's rulemaking process, the FAA narrowed the choice to two alternatives, Options 2 and 5 (as noted, Option 2 would require 16g seats in new airplanes only, while Option 5 would mandate 16g seats in both new and in-service airplanes). Option 2 would have a benefit-to-cost ratio greater than 1.0, but averts fewer fatalities and serious injuries than Option 5. For the reasons noted throughout this document, Option 5 was adopted. (See section IV below for benefit/cost results).

Specifically, the FAA proposes to add new § 121.311(j) and (k) to prohibit the operation after four years from the issuance date of the final rule, of a transport category airplane type-certificated after January 1, 1958, in passenger-carrying operations under part 121 unless (1) for airplanes manufactured on or after four years from the issuance date of the final rule], all passenger and FA seats meet the requirements of § 25.562, and (2) for airplanes manufactured before four years from the issuance date of final

rule, all passenger seats and all FA seats meet the requirements of § 25.562 in effect on June 16, 1988 after any passenger seat or any FA seat on that airplane is replaced. On and after 14 years from the issuance date of the final rule, no person may operate a transport category airplane type certificated after January 1, 1958, in passenger carrying operations under this part unless all passenger and all FA seats on the airplane meet the requirements of § 25.562 in effect on June 16, 1988.

This proposal reduces the overall cost compared to some rule options since operators are not locked into accelerated seat replacement schedules for their existing aircraft. However this proposal ensures that when the operators elect to replace their seats (i.e., at their own discretion), the new seats would be "full" 16g (i.e. must meet all requirements of 25.562) and one level of safety for seats would ultimately be developed throughout the fleet. This proposal was also chosen because it mandates that the newly manufactured aircraft, or those aircraft that will be in the fleet the longest, would be required to meet full 16g seat certification the soonest.

The FAA notes that this proposal differs from the previous proposals in several ways. After considering the numerous comments and taking into account seat manufacturing and replacement practices, the FAA has determined that a 4-year compliance period is sufficient to ensure seat manufacturers will be able to provide 16g seats for the affected airplanes. Furthermore, the FAA has established two compliance schedules: one for newly manufactured airplanes and one for in-service airplanes. For airplanes manufactured after 4 years from the issuance date of the final rule, the proposal is consistent with the proposal discussed at the 1998 public meeting. This proposal would

ensure that 16g seats are installed on the newest airplanes that will be in the fleet the longest amount of time.

For airplanes manufactured before 4 years from publication of the final rule, the proposal would require an operator to replace all passenger seats and all FA seats only when the operator chooses to replace any passenger seat; however, full replacement with 16g seats would be required within another 10 years at most. Thus, part 121 operators would have discretion in replacing current seats with 16g seats up to 14 years after the publication date of the final rule. Notwithstanding, the FAA believes that virtually all 9g seats will have been replaced with 16g seats by the operators during the normal course of business.

The FAA notes that for purposes of this proposal, replacement means the removal of a seat and the installation of a different seat. The proposal would not apply to the removal and reinstallation of the same seat in the same airplane and does not apply to the repair, replacement of seat dress covers, or seat cushion replacements. The FAA also notes that this proposal only applies to passenger and FA seats; flight deck seats are not included.

III. Benefits/Costs Methodology

This section explains and summarizes the relevant data used in this analysis and describes the methodology used to calculate benefits and costs. Estimated dollar benefits and costs are presented in Section IV below.

To estimate the potential benefits and costs of this new proposal, it was first necessary to divide seat installations into three broad "compliance" categories: 1) "Full 16g" seat installations are compliant with 14 CFR 25.562 (a), (b), and (c).[2] 2) "Partial 16g" seat installations are compliant with some of 14 CFR 25.562 (a), (b), and (c) but have not been tested to meet all occupant injury criteria.[3] 3) "9g" seat installations refer to older vintages of seats that meet 9g structural requirements only.

In addition, the projected population of seats was divided into different groups depending on the date of aircraft manufacture and the projected date of seat replacement. Replacement seats are assumed to be distributed according to the estimated proportion of full 16g, partial 16g, and 9g seat certification programs. For example, if 10% of seat certification programs are for 9g seats, it is assumed approximately 10% of seats installed or replaced will be 9g seats.

Table 1 below shows the projected distribution of seats **in the absence of regulatory action**. The distribution was based on the following assumptions:

[2] In some cases, exemptions may apply to certain installations (e.g. pilot/co-pilot seats, flight deck floors).

[3] Note that this definition does not necessarily imply that the seat/installation cannot meet all the requirements of 14 CFR 25.562, only that there is no certification testing to demonstrate its compliance (or noncompliance).

1. Part 121 airplanes are retired after 42 years of service.
2. Seat replacement uniformly distributed with mean seat life of 14 years.
3. Fleet/seat growth based on *FAA Aerospace Forecast*.
4. Relationship of full 16g to partial 16g seats stays the same.

Table 1 also breaks down the future distribution of seat types into five groups:

- Group I: Airplanes manufactured before 1992 having seats installed before 1992. While 16g seats were being installed before this date, the majority of these seats are 9g.

- Group II: Airplanes manufactured before 1992 having replacement seats installed after 1991. Some (unknown) proportion of seats in this group may have partial 16g performance although no airplane model in this group is 16g certificated. Note that the sum of Group I and Group II declines over time as these airplanes/seats are retired from passenger service.

- Group III: Airplanes manufactured after 1991. Some (unknown) proportion of seats in this group may have partial 16g performance.

- Group IV: Airplanes manufactured after 1992 and compliant with some parts of 14 CFR §25.562 (certificated partial 16g capability).

- Group V: Airplanes manufactured after 1992 and fully compliant with 14 CFR § 25.562 (e.g. certification basis includes Amendment 25-64, or full 16g testing was performed voluntarily). If this proposal were in effect, Group V seats would be projected to increase from approximately 23,000 at year end 1999 to 1.8 million in 2020 (versus approx. 560,000 in 2020 under the "baseline" assumption).

Table 1: Baseline Seat Distribution Forecast by Seat Type
(U.S. 14 CFR part 121 passenger seats only)

	Group I	Group II	Group III	Group IV	Group V
1999	272,720	205,271	178,598	36,534	22,960
2000	235,773	242,218	178,852	50,512	34,143
2001	194,919	283,072	179,154	67,114	47,424
2002	154,523	323,304	179,483	85,209	61,900
2003	115,007	362,820	179,857	105,771	78,349
2004	77,682	400,025	180,218	125,642	94,246
2005	46,440	431,215	180,680	151,045	114,569
2006	26,910	450,745	181,091	173,633	132,639
2007	13,760	463,791	181,556	199,219	153,108
2008	4,650	472,531	182,039	225,754	174,336
2009	0	476,011	182,555	254,147	197,050
2010	0	469,770	183,160	287,429	223,676
2011	0	459,375	183,801	322,679	251,876
2012	0	448,921	184,467	359,324	281,192
2013	0	442,791	185,116	395,016	309,746
2014	0	437,926	185,779	431,504	338,936
2015	0	427,412	186,528	472,658	371,859
2016	0	414,061	187,334	517,004	407,336
2017	0	399,673	188,182	563,627	444,635
2018	0	388,254	189,032	610,404	482,056
2019	0	381,358	189,871	656,560	518,981
2020	0	368,871	190,802	707,746	559,930

Two critical questions are: 1) What is the performance of Group II/III seat installations relative to full 16g and partial 16g installations? 2) How will the composition of Group II/III installations change over time? Will operators continue to upgrade these seats in the absence of rulemaking? Projected (2000-2020) fatality and serious injury rates are equal to the fatality and injury rates for U.S. 14 CFR part 121 (scheduled and nonscheduled) operations for the period 1984-1998, the time period used in Report DOT/FAA/AR-00/13/April 2000,[4] and are summarized in Section IV below. Although the report evaluated worldwide accidents to determine the degree to which 16g seats would reduce casualties in a typical accident (note that a typical U.S. accident is not significantly different from a typical non-U.S. accident in terms of accident outcomes), it is important to emphasize that the benefits in this regulatory evaluation are based on the **U.S. part 121 accident rate.**

The Benefits Section explains the method used to estimate benefits, constructs baseline estimates of the population of affected airplanes, projects the distribution of part 121 seat types for the period 2000-2020 (assuming no future regulatory action), and forecasts future fatality and serious injury rates. The Cost Section explains the methods used to estimate costs and constructs baseline cost estimates for passenger and FA seats.

[4] *Benefit Analysis for Aircraft 16G Dynamic Seats*, April 2000 Final Report, prepared by R.G.W. Cherry & Associates Limited. This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161. It can also be accessed through the FAA's William J. Hughes Technical Center Full Text Technical Reports Internet site at http://www.fire.tc.faa.gov/reports/report2.stm in Adobe Acrobat Portable Document Format (PDF).

A. Benefits Model

The aforementioned ASY 16g-seat study estimated the safety benefits of 16g seats from a detailed analysis of 25 impact-related accidents involving airplanes operating under 14 CFR part 121 (or equivalent) during the period 1984-1998 (the accidents delineated in the DOT/FAA report cited above). This study projects that the baseline fatality and serious injury rates for the period 2000-2020 will be 0.2868 and 0.0436 per million enplanements, respectively. (See Section II of the ASY 16g-seat study).

Based on engineering assessments of the possible effects of full 16g seats, Monte Carlo simulations were used to assess a high, median, and low value for the total achievable (net) reduction in fatalities and serious injuries for each accident/scenario. Risk reduction benefits for the U.S. part 121 fleet, then, were estimated in three ways:

First, the DOT/FAA report estimated the number of averted U.S. casualties by assuming that the ratio of U.S./World casualties averted is proportional to the ratio of U.S./World accidents (Table II.4 in the ASY 16g-seat study).[5] Second, it estimated the number of U.S. casualties averted strictly based on

[5] In this case, "World" accidents refer to events involving non-U.S. carriers that are operated under regulatory requirements similar to part 121 (in the estimation of Cherry). The accident proportion is calculated using a set of ground-impact accidents selected for study by Cherry. In fact, the ratio of U.S./World casualties is less that the ratio of U.S./World accidents. I.e., there are fewer preventable casualties, at least in the accident set studied, involving U.S. carriers versus world carriers as a whole.

the part 121 accidents studied (Table II.5 in the ASY 16g-seat study). Third, it extrapolated the U.S. specific data, to U.S. part 121 ground-impact accidents that were not studied.

Baseline risk estimates are computed as follows:

- ***Construct an estimate of the future number of domestic enplanements.*** Estimates of the number of future enplanements were derived from the *FAA Aerospace Forecasts, Fiscal Years 1999-2010;* enplanements are projected to increase from 676.9 million in 2000 to 1,450.3 million in 2020. Enplanement totals are then combined with fatality/serious-injury rates and seat distribution to assess risk reduction potential per seat type (see below).

- ***Construct a baseline estimate of the distribution of seat types.*** This analysis divides the projected population of seats into different groups (see the discussion below) depending on the date of aircraft manufacture and the projected date of seat replacement. The distribution of enplanements across seat groups is assumed to be proportional to the number of seats in each group. Replacement seats are assumed to be distributed according to the estimated proportion of full 16g, partial 16g, and 9g seat certification programs. For example, if 10% of seat certification programs are for 9g seats, it is assumed approximately 10% of seats installed or replaced will be 9g seats.

- ***Forecast fatality and serious injury rates.*** This analysis postulates that the projected rates of fatalities and serious injuries per enplanement

during the forecast period are equal to the rates observed during the period 1984-1998 (U.S. 14 CFR part 121 fleet only). Key assumptions: 1) the rate is assumed to reflect a 9g baseline, 2) no improvements in historical fatality or injury rates are expected to occur during the forecast period, and 3) the risk reduction potential of 16g seats is not expected to improve (e.g., due to the introduction of additional cabin safety measures). *To illustrate: Two-thousand-one-hundred-and-sixty-three fatalities were recorded during 14 CFR part 121 operations during the study period (1984-1998—see Table II.3 of the ASY 16g-seat study). In the same period, part 121 operators accumulated 7,540.9 million enplanements. Therefore, the historical (and projected) rate of fatalities is 2,163 ÷ 7,540.9 = 0.2868 per million enplanements. Similarly, for serious injuries, the rate is 329 ÷ 7,540 = 0.0436 per million enplanements.*

- ***Estimate the reduction in fatalities and serious injuries during the study period (1984-1998).*** *Based on the DOT/FAA report (part 121 benefits based on worldwide fleet accident characteristics), the fleetwide use of full 16g seats would have averted 68 fatalities and 79 serious injuries (net) during the study period.*

- ***Estimate the percentage reduction in fatalities and serious injuries during the study period.*** The number of fatalities averted due to 16g seats divided by the total number of fatalities during the study period yields an estimate of the percentage reduction in fatalities that would be achieved by requiring 16g seats. Similarly, the number of serious injuries averted due to 16g seats divided by the total number of serious injuries yields an

estimate of the percentage reduction in injuries that would be achieved by requiring 16g seats. *To illustrate: There were a total of 2,163 fatalities during the study period (U.S. 14 CFR part 121). As noted above, 68 fatalities could have been averted had 16g seats been installed in the part 121 fleet. Therefore, a 16g seat requirement could have averted 68 ÷ 2,163 = 3.14% of fatalities during the study period. Similarly, 16g seats could have averted 79 ÷ 329 or 24% of serious injuries.*

- ***Determine adjustment factors for each seat group.*** The degree to which a new seat reduces fatality and injury risks is a function of the vintage of seat it is replacing. As noted elsewhere in this study, however, the DOT/FAA report did not estimate the relative performance of full and partial 16g seats. Aircraft Certification Service engineers provided subjective estimates of the performance of seats in Groups I-V (see discussion below). *Example: A Group V seat (full compliance with 14 CFR 25.562) has an effectiveness rating of 1.0. Therefore, this type of seat is expected to reduce serious injuries by 1.0 x 24% = 24% relative to a 9g seat. A Group II seat (i.e., does not meet occupant injury criteria) has an effectiveness rating of 0.1, or 10% of the effectiveness of a full 16g seat. Therefore, Group II seats are expected to reduce serious injuries by .1 x 24% = 2.4% relative to a 9g seat.*

- ***Forecast baseline fatality and serious injury rates.*** Baseline estimates of the numbers of fatalities and serious injuries for the forecast period are obtained by combining: 1) the baseline (9g) fatality and serious

injury rates, 2) the baseline distribution of seat types and enplanements, 3) the risk reduction potential of 16g seats, and 4) the adjustment factors.

- ***Forecast the effect of each option on the distribution of seats.***

Potential benefits, then, reflect the degree to which any option alters the future distribution of seat types (relative to the projected baseline distribution). That is, the more the distribution shifts to full 16g and partial 16g seats, the lower the expected future rates of fatalities and serious injuries.

The steps outlined above are used to derive baseline estimates of fatalities and serious injuries. The baseline estimates, then, are compared to fatality/serious-injury estimates based on the expected distribution of seats following full implementation of the rule.

Passenger seat benefits -

Over the 2000-2020 period of analysis, the proposed requirements would avert 112.1 fatalities and 130.2 serious injuries. Using $3.0 million as the monetary equivalent of a statistical fatality averted and $0.5 million per serious injury averted, this is equivalent to a benefit of $401.4 million undiscounted, or $131.9 million discounted.

Flight Attendant seat benefits -

Over the 2000-2020 period, the proposed requirements would avert 2.3 FA fatalities and 2.7 FA serious injuries; this equates to benefits of $8.2

million undiscounted, or $2.7 million discounted. However, as delineated in Section IV below, the FAA believes the direct quantified benefits of averted FA casualties could lead to significant additional benefits in terms of averted passenger casualties (i.e., the value of trained FA's in assisting passengers in emergency egress situations).

B. Determination of Costs

The analysis presented at the 1998 public meeting considered a proposal that would have required full 16g compliance for newly manufactured airplanes and complete retrofit with 16g compatible seats for in-service airplanes (see Table ES-1 in 16g-seat study). Seat replacement costs associated with that proposal would have exceeded significantly those of this SNPRM as a result of incremental costs to recertify seats already installed on aircraft, which would have been required under "16g-compatibility." In addition, the current proposal includes more accurate (in this case, lower) estimates of seat certification costs. The regulatory evaluation for the original 1988 NPRM identified seat weight, seat replacement, and seat certification as the largest sources of incremental costs.

The FAA has chosen a final compliance timeframe in this SNPRM that allows airlines to exercise their own discretion in seat replacement up to 14 years after the rule is enacted, but then ensures that the transport fleet will be upgraded to the 16g standard. New information provided by seat manufacturers indicates that, at least with respect to passenger seats, the weight and costs of 16g seats are the same as 9g seats; in fact, current 16g seats are in some cases lighter than older seats. In addition, the options considered

in this analysis emphasize "discretionary replacement;" that is, requiring compliance for in-service aircraft only when operators choose to replace seats (rather than stipulating a short-term mandatory retrofit period); the data show that only about 7.5% of seats would require premature replacement at the end of the 14-year "discretionary" period. This results in approximately a two percent increase in costs over the costs estimated without the 14-year deadline.

The following discussion outlines the process used to determine baseline passenger and FA seat costs.

The current number of seat certification programs and the current distribution of seat certification programs (9g, partial 16g, full 16g) both based on FAA data, were extrapolated forward using the same rate of growth as the number of seat replacements and installations. That is, the number of seat certification programs in the future is assumed to be a constant fraction of the number of seats projected to be installed/replaced. Information on the average cost of a certification program was obtained from industry sources; these costs were projected into the future under each alternative option and compared to the baseline (i.e. voluntary industry action) to determine incremental certification costs.

Passenger seat costs -

Industry data indicates an average incremental 16g seat certification cost of $300,000, which may be amortized over several aircraft types with the same installations; on average, one certification would be applicable to

approximately 1,200 seats. The proposed requirement entails no incremental seat replacement costs, since the cost of a new upgraded seat and its installation is the same as for a non-upgraded seat. Current data show that approximately 44% of current programs are for full 16g, 55% are for partial 16g, and one percent of programs are for 9g seats.

Over the 2000-2020 period of analysis, total costs attributable to upgrading passenger seats equal $232.9 million undiscounted, or $105.4 million discounted.

Flight attendant seat costs -

The same process used to estimate incremental passenger seat certification costs was applied to the estimation of incremental FA seat certification costs.

Current and projected number of certification programs. The current number of FA seat certification programs was estimated from industry sources and extrapolated using the process described above. As before, the ratio of certification programs to seats installed/replaced is assumed to be roughly constant during the 2000-2020 forecast period. Following the assumption used in the 1998 regulatory evaluation, the number of FA seats are assumed to equal 2% of passenger seats; that is, one FA seat per 40-50 passenger seats.

Current and projected distribution of FA seat certification programs. The current distribution of FA seat certification programs was determined from data obtained from industry: 1) full 16g, approximately 33%, 2) partial 16g,

approximately 42%, 3) 9g, approximately 25%. Again, in the absence of additional rulemaking, this distribution is assumed to be constant during the forecast period.

Full 16g certification program costs for FA seats are approximately $250,000 per program. The average replacement cost is $5,400 per seat and $85 for installation. This analysis assumes that FA seats are rarely replaced, since they usually last the life of the airframe. Additional fuel costs associated with increased weight equals approximately $13 per seat per year.

Over the 2000-2020 period of analysis, total costs attributable to upgrading FA seats equal $285.7 million undiscounted, or $139.3 million discounted.

IV. Upcoming FAA Certification-Streamlining Efforts

As outlined in the Related Activity section of this SNPRM, the FAA is initiating changes to the airplane seat certification process that are expected to result in reductions in required testing for both passenger and FA seats. These streamlining efforts may eliminate some dynamic seat tests and make other tests simpler to perform. For example, in-service changes or variation in design that currently require a full-scale test may instead be substantiated through a component level test(s). Such tests are currently being developed and evaluated to address both lumbar and head injury criteria (HIC), which may have relevance for FA seat programs in particular. In either of these cases, the scope of the test program would be reduced as would the associated costs.

Part of the overall objective of the streamlining program is to capitalize on the work and expertise of the seat manufacturers, and prevent duplicate review by the FAA or airframe manufacturer(s). The current process often results in Technical Standard Order (TSO) qualification and installation qualification requiring separate, rather than complementary, effort. This administrative cost is significant and, if reduced or eliminated, would reduce the overall certification burden. Note that in addition to reducing specific certification (e.g. testing) costs, streamlining would reduce the time required to gain seat approval, which is often cited as a major component of certification costs.

The aforementioned benefits expected to accrue from the streamlining initiatives would be more heavily weighted to passenger seat programs than to FA seat programs, since the latter tend to have fewer tests per program. However, all the reductions in certification procedures specified would also benefit FA seat programs and would have a substantive effect on reducing costs of those programs as well. Once streamlining is implemented, the FAA believes a significant reduction in tests for both FA seats and passenger seats would be achieved. Although a definitive estimate of the cost savings that a reduction in testing translates to is not yet determinable, the FAA believes it could potentially result in a considerable reduction in nonrecurring certification program costs.

V. Benefits/Costs Summary

As previously stated, the FAA estimates that this proposed rule to require upgraded passenger and FA seats for both new and in-service airplanes would statistically avert approximately 114 fatalities and 133 serious injuries during a 20-year period following the effective date of the rule. At $3.0 million per statistical fatality averted and $0.5 million per statistical serious injury averted, the estimated benefits equal $409.6 million, or $134.6 million at present value (year 2000 dollars). The total associated costs are approximately $518.6 million, or $244.7 million at present value. These costs are based on current certification programs and testing methods. Implementation of the streamlining procedures previously noted would no doubt reduce the estimated costs.

Of the $518.6 million in undiscounted total costs for the proposed rule, $285.7 million, or 55%, are attributed to upgrading FA seats. Compared to passenger seats, FA seats have relatively high certification costs, as well as significant variable costs to replace. The high replacement costs of FA seats occurs because the proposed rule would require these seats to be upgraded at the same time as passenger seats, whereas FA seats normally last the life-time of the airplane. However, the higher costs are offset by increased per-seat benefits since the seats prevent injury to the FAs and therefore permit them to perform safety functions and help save the lives of passengers (see further discussion below on the benefits attributable to FAs).

The proposed rule allows passenger seats to be upgraded at a normal replacement time up to 14 years after the publication of the rule. Due to technological improvements there is essentially no difference in weight or cost between a 9g and 16g passenger seat. The only additional cost of upgrading passenger seats in the normal replacement period is the higher expense of a 16g-certification program. Unlike the passenger seat upgrade, the entire cost of upgrading FA seats is attributed to the rule. The cost of replacing FA seats includes seat certification, procurement, installation, and increased fuel burn because of the higher operating weight.

Because slightly more than half of the estimated cost of this proposal is attributed to upgrading FA seats, the FAA considered an alternative that would have required upgrading **only passenger seats** at the normal replacement time. The FAA rejected that alternative, as it would have resulted in FA seats being less safe than passenger seats. FAs have the critical responsibility to perform life-saving duties in precisely the kind of impact-accident wherein 16g-seats enhance the survivability of passengers.

The FAA estimated the additional number of averted-passenger-fatalities (i.e., those attributable to the actions of FAs who survived impact as a result of improved 16g-seats) required to increase the value of benefits sufficient to equal costs. In the data presented above, the undiscounted costs exceed benefits by $109 million. As noted in the benefits section, the proposed requirements would avert 2.3 FA fatalities and 2.7 FA serious injuries, resulting in five additional functioning FAs. If those five FAs assist 36 passengers, thus averting 36 potential fatalities (or, seven per FA), the estimated benefits would equal the costs (i.e., $109 million divided

by $3 million (value of averted fatality) = approximately 36 averted fatalities).

The evidence supports the FAA position that the actions of five additional functioning FAs can avert at least an additional 36 fatalities in one or more survivable accidents. A majority (perhaps 60-70 percent) of the 25 total accidents evaluated were survivable in that the initial impact did not kill or severely incapacitate all occupants onboard the aircraft. In 11 of the survivable accidents, FAs were instrumental in assisting passengers and/or shouting instructions to passengers during the emergency evacuation(s). After excluding three accidents in which the accident reports only generalized the FAs' actions, the FAA evaluated eight accidents to determine how many additional passengers were saved from fatal or serious injury by the actions of able-bodied FAs. One accident in particular clearly illustrates the FAs' crucial roles. In that accident, nearly three quarters of the passengers survived the initial impact, but most were seriously injured. As noted on p. A-179 of the DOT/FAA report: "The prompt and successful evacuation of 63 persons out of the passenger cabin during increasing smoke and extensive fire was directly due to the behavior of the cabin crew, in spite of their injuries. The two active cabin attendants played a significant and unquestionable role in preventing the panic and organizing the movement of passengers to the exits." **In fact, in the eight sample accidents, 13 FAs were responsible for the safe egress of approximately 140 passengers, or about 11 passengers per FA.**

The DOT/FAA report provides additional evidence of the implicit value of FAs, but from the opposite perspective, i.e., passenger-survival outcomes in

accidents wherein FAs were incapacitated. In the report, there were three U.S. survivable accidents in which six FAs died or were seriously injured from impact; and, in these accidents, 44 passengers died primarily from fire or smoke inhalation. The FAA cannot state with certainty how many of these passengers could have been saved by the FAs had the latter survived initial impact(s); however, in light of the survival outcomes described above (with able-bodied FAs) the FAA believes most of the cited 44 passenger fatalities could have been averted. And, with the incorporation of current fire protection standards into new-production airplanes (increasing time-margins for safe egress), surviving able-bodied FAs could save even more lives in future accidents.

Based on the accident circumstances just described, the FAA strongly believes the projected five additional FAs would save at least an additional 36 passengers (i.e., seven per FA) in future accidents over the next 20 years. Consequently, the costs of retrofitting the FA seats are justified. The FAA maintains this is a reasonable contention, given the conservatve methodology applied - i.e. including only those survivable accidents in which FAs' actions and/or their "capability-states" were clearly described or determined.

The FAA is aware of some studies demonstrating the value of cabin crew during emergency evacuations and requests comments with documented evidence regarding the value of FAs in airplane evacuations.

In conclusion, since the 16g-seat-derived benefits of averted passenger and FA casualties combined with the additional passenger lives saved by able-

bodied FAs exceed the total seat-replacement costs, the FAA deems this SNPRM to be cost-beneficial.

VI. Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) establishes "as a principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that principle, the Act requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions. The Act covers a wide-range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a proposed or final rule will have a significant economic impact on a substantial number of small entities. If the determination is that it will, the agency must prepare a regulatory flexibility analysis as described in the Act. However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the 1980 act provides that the head of the agency may so certify and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

The proposed rule would affect manufacturers of part 25 transport category airplanes produced under future new airplane type certifications, and part 121 operators. For manufacturers and Part 121 operators, a small entity is one with 1,500 or fewer employees. No part 25 airplane manufacturer has 1,500 or fewer employees. Consequently, the proposed rule would not have a "significant economic impact on a substantial number" of small part 25 manufacturers.

There are approximately 100 part 121 operators in the potential pool of small entities. The FAA performed a detailed analysis of the economic impacts on 33 of these operators who clearly: (1) had less than 1,500 employees (the size threshold for classification as a small entity); (2) were not subsidiaries of larger organizations; and, (3) reported operating revenue to the Department of Transportation. The FAA believes these 33 are representative of the affected small firms.

The FAA's methodology in assessing small-entity impact for this proposed rule is as follows. Recent data indicate that airplane seats are replaced about every 14 years. The FAA assumed that the current inventory of passenger seats (and now, by virtue of this proposal, FA seats also) would, on average, require replacement in seven years (that is, aggregatively, for cost analysis purposes, operators would have to retrofit at the midpoint of the 14-year replacement cycle; this is obviously a conservative assumption). These retrofit costs were then annualized using the sinking-fund methodology whereby an annual amount is set aside each year for "x" years (or in this case, 7 years) accumulating to the required capital expenditure. The FAA then compared each firm's required annual replacement cost to the firm's

annual operating revenue. The calculated **annual-cost(s)-as-a-percent-of-annual-operating-revenue(s)** ranged from lows of less than one-tenth of one percent (in 14 of the firms) to a maximum of only 1.1 percent (in one firm). [The table at the end of this document provides detailed information]. Based on the described expense/revenue relationships, the FAA certifies that the proposed rule would not have a significant economic impact on a substantial number of small entities. The FAA invites comments on the estimated small entity impact from interested and affected parties.

VII. International Trade Impact Assessment

The Trade Agreement Act of 1979 prohibits Federal agencies from engaging in any standards or related activities that create unnecessary obstacles to the foreign commerce of the United States. Legitimate domestic objectives, such as safety, are not considered unnecessary obstacles. The statute also requires consideration of international standards and where appropriate, that they be the basis for U.S. standards. In accordance with the above statute, the FAA has assessed the potential effect of this SNPRM and has determined that the net effect is to raise the cost and value of exported and imported compliant transport category airplanes. The FAA believes the costs are offset by the value of enhanced safety and thus the proposed rule has a neutral impact on international trade.

VIII. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (the Act), enacted as Pub. L. 104-4 on March 22, 1995, requires each Federal agency, to the extent

permitted by law, to prepare a written assessment of the effects of any Federal mandate in a proposed or final agency rule that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more (adjusted annually for inflation) in any one year. Section 204(a) of the Act, 2 U.S.C. 1534(a), requires the Federal agency to develop an effective process to permit timely input by elected officers (or their designees) of State, local, and tribal governments on a proposed "significant intergovernmental mandate." A "significant intergovernmental mandate" under the Act is any provision in a Federal agency regulation that will impose an enforceable duty upon State, local, and tribal governments, in the aggregate, of $100 million (adjusted annually for inflation) in any one year. Section 203 of the Act, 2 U.S.C. 1533, which supplements section 204(a), provides that before establishing any regulatory requirements that might significantly or uniquely affect small governments, the agency shall have developed a plan that, among other things, provides for notice to potentially affected small governments, if any, and for a meaningful and timely opportunity to provide input in the development of regulatory proposals.

The FAA determines that this proposed rule does not contain a significant intergovernmental mandate.

APPENDIX

Regulatory Flexibility Determination - Small Entities Potentially Affected by SNPRM

Air_Operator_Name	Operator FAR	FAR_PART_NUM	ACFT_MMS_CODE	Number of Aircraft	Max Passenger Seats	Total Passenger Seats	Total Flight Attendant Seats	Passenger Seat Cert. Costs	Flt. Att. Seat Cert. Costs	Flt. Att. Seat Unit Costs	Total Flt. Att. Seat Costs	F.A. Seat Wt. Costs (ann.)	Total Seat Costs	Seat Costs Amtz'd.	Ann. Oper. Rev.	Ann. Costs % of Ann. Oper. Rev.
AIR TRANSPORT INTERNATIONAL LIMITED LIABILITY CO	121	121	DC-8-62	5	32	160	5	34,667	25,000	5,485	52,425	65	87,092	10,129		
AIR TRANSPORT INTERNATIONAL LIMITED LIABILITY CO	121	121	DC-8-62F	2	32	64	2	13,867	10,000	5,485	20,970	26	34,837	4,051		
SUBTOTAL								48,533	35,000		73,395	91	121,929	14,180	300,660,000	0.0047
ALLEGIANT AIR INC	121	121	DC-9-21	1	89	89	6	19,283	30,000	5,485	62,910	78	82,193	9,576		
ALLEGIANT AIR INC	121	121	DC-9-51	2	115	230	2	49,833	10,000	5,485	20,970	26	70,803	8,208		
SUBTOTAL								69,117	40,000		83,880	104	152,997	17,783	11,618,000	0.1531
ASPEN AIRWAYS INC	121	121	CV-440-580	1	50	50	1	10,833	5,000	5,485	10,485	13	21,318	2,476	NA	NA
ASTRAL AVIATION INC	121	121	DO-328-300	5	32	160	5	20,000	25,000	5,485	52,425	65	72,425	8,434	11,670,368	0.0723
AVIATION SERVICES LTD	121/135	121	SD-3-30	3	30	90	3	19,500	15,000	5,485	31,458	39	50,958	5,927	NA	NA
CENTURY MANAGEMENT CORP	121	121	B-757-200	1	228	228	5	49,400	25,000	5,485	52,425	65	101,825	11,831	NA	NA
CHAPARRAL AIRLINES INC	121/135	121	GA-159-159	5	37	185	5	40,083	25,000	5,485	52,425	65	92,508	10,766	NA	NA
CHAUTAUQUA AIRLINES INC	121	121	SF-340-A	26	30	780	26	169,000	130,000	5,485	272,610	338	441,610	51,367		
CHAUTAUQUA AIRLINES INC	121	121	EMB-145-LR	12	50	600	12	75,000	60,000	5,485	125,820	156	200,820	23,361		
SUBTOTAL								244,000	190,000		398,430	494	642,430	74,729	20,832,850	0.3587
CHICAGO EXPRESS AIRLINES INC	121	121	SF-340-340B	9	37	333	9	72,150	45,000	5,485	94,365	117	166,515	19,358	NA	NA
COLGAN AIR INC	121	121	SAAB-340-B	3	32	96	3	20,800	15,000	5,485	31,466	39	52,266	6,077	5,465,168	0.1112
FALCON AIR EXPRESS	121	121	B-727-200	5	170	850	20	184,167	100,000	5,485	209,700	260	393,867	45,773	53,399,000	0.0857
FRONTIER AIRLINES INC	121	121	B-737-200	1	118	118	3	25,567	15,000	5,485	31,455	39	57,022	6,628		
FRONTIER AIRLINES INC	121	121	B-737-200	4	119	476	12	103,133	60,000	5,485	125,820	156	228,953	26,612		
FRONTIER AIRLINES INC	121	121	B-737-200	2	122	244	6	52,867	30,000	5,485	62,910	78	115,777	13,456		
FRONTIER AIRLINES INC	121	121	B-737-300	16	136	2,176	48	471,467	240,000	5,485	503,280	624	974,747	113,259		
FRONTIER AIRLINES INC	121	121	B-737-300	2	138	276	6	59,800	30,000	5,485	62,910	78	122,710	14,258		
SUBTOTAL								712,833	375,000		786,375	976	1,499,208	174,213	364,743,000	0.0478

Regulatory Flexibility Determination - Small Entities Potentially Affected by SNPRM

Air_Operator_Name	Operator FAR	FAR_PAR T_NUM	ACFT_MMS_CODE	Number of Aircraft	Max Passenger Seats	Total Passenger Seats	Total Flight Attendant Seats	Passenger Seat Costs	Fl. Att. Seat Costs	Fl. Att. Seat Unit Costs	Total Fl. Att. Seat Costs	F. A. Seat Wt. Costs (ann.)	Total Seat Costs	Seat Costs Annlz'd	Ann. Oper. Rev.	Ann. Costs % of Ann. Oper. Rev.
GREAT LAKES AVIATION LTD	121/135	121	EMB-120-RT	2	30	60	2	13,000	10,000	5,485	20,970	26	33,970	3,951		
GREAT LAKES AVIATION LTD	121/135	121	EMB-120-ER	6	30	180	6	39,000	30,000	5,485	62,910	78	101,910	11,854		
SUBTOTAL								52,000	40,000		83,880	104	135,880	15,805	33,299,543	0.0475
GULFSTREAM INTERNATIONAL AIRLINES INC	121	121	DHC-7-102	4	50	200	4	43,333	20,000	5,485	41,940	52	85,273	9,906	19,507,342	0.0508
JETBLUE AIRWAYS CORPORATION	121	121	A-320-232	8	162	1,296	32	280,800	160,000	5,485	335,520	416	616,320	71,634	22,661,000	0.3161
LAKER AIRWAYS INC	121	121	B-727-100	0	58	0	0	0	0	5,485	0	0	0	0		
LAKER AIRWAYS INC	121	121	B-727-200	0	70	0	0	0	0	5,485	0	0	0	0		
SUBTOTAL								0	0		0	0	0	0	NA	NA
LEGEND AIRLINES INC	121	121	DC-9-32	6	56	336	12	72,800	60,000	5,485	125,820	156	198,620	23,107	5,819,000	0.3971
LORAIR LTD	121	121	B-737-247	2	125	250	6	54,167	30,000	5,485	62,910	78	117,077	13,607	NA	NA
MIAMI AIR INTERNATIONAL INC	121	121	B-727-200	8	173	1,384	32	299,867	160,000	5,485	335,520	416	635,387	73,837	94,771,000	0.0779
MIDWAY AIRLINES CORPORATION	121	121	CL-600-2B19	23	50	1,150	23	249,167	115,000	5,485	241,155	299	490,322	56,957		
MIDWAY AIRLINES CORPORATION	121	121	F-28-MK0100	8	100	800	16	173,333	80,000	5,485	167,760	208	341,093	39,622		
MIDWAY AIRLINES CORPORATION	121	121	B-737-700	2	128	256	6	32,000	30,000	5,485	62,910	78	94,910	11,045		
SUBTOTAL								454,500	225,000		471,825	585	926,325	107,625	241,894,000	0.0445
NATIONS AIR EXPRESS INC	121	121	B-737-291	1	125	125	3	27,083	15,000	5,485	31,455	39	58,538	6,803	1,200,000	0.5669
NORTH AMERICAN AIRLINES	121	121	B-737-800	1	169	169	4	21,125	20,000	5,485	41,940	52	63,065	7,339		
NORTH AMERICAN AIRLINES	121	121	B-737-800	1	172	172	4	21,500	20,000	5,485	41,940	52	63,440	7,383		
NORTH AMERICAN AIRLINES	121	121	B-757-28A	2	217	434	10	94,033	50,000	5,485	104,850	130	198,883	23,112		
SUBTOTAL								136,658	90,000		188,730	234	325,388	37,834	73,589,000	0.0514
OMNI AIR INTERNATIONAL INC	121	121	DC-10-30	2	370	740	16	160,333	80,000	5,485	167,760	208	328,093	38,120		
OMNI AIR INTERNATIONAL INC	121	121	DC-10-10	2	380	760	16	164,667	80,000	5,485	167,760	208	332,427	38,621		
SUBTOTAL								325,000	160,000		335,520	416	660,520	76,741	65,666,000	0.1169

Regulatory Flexibility Determination - Small Entities Potentially Affected by SNPRM

Air_Operator_Name	Operator_FAR	FAR_PART_NUM	ACFT_MMS_CODE	Number of Aircraft	Max Passenger Seats	Total Passenger Seats	Total Flight Attendant Seats	Passenger Seat Cert. Costs	Fl. At. Seat Cert. Costs	Fl. At. Seat Unit Costs	Total Fl. At. Seat Costs	F.A. Seat Wt. Costs (ann.)	Total Seat Costs	Seat Costs Ann'z'd	Ann. Oper. Rev.	Ann. Costs % of Ann. Oper. Rev.
PACIFIC ISLAND AVIATION INC	121	121	SD-3-60	3	30	90	3	19,500	15,000	5,485	31,455	39	50,955	5,927	1,144,463	0.5179
PAN AMERICAN AIRWAYS CORP	121	121	B-727-200	6	173	1,038	24	224,900	120,000	5,485	251,640	312	476,540	55,378	16,784,000	0.3299
PAN AMERICAN WORLD AIRWAYS INC	121	121	A-300-B4	1	254	254	6	55,033	30,000	5,485	62,910	78	117,943	13,707	NA	NA
PARADISE ISLAND AIRLINES INC	121	121	DHC-7-102	1	50	50	1	10,833	5,000	5,485	10,485	13	21,318	2,476	3,479,211	0.0712
PLANET AIRWAYS INC	121	121	B-727-100	1	128	128	3	27,733	15,000	5,485	31,455	39	59,188	6,878		
PLANET AIRWAYS INC	121	121	B-727-224	1	173	173	4	37,483	20,000	5,485	41,940	52	79,423	9,230		
SUBTOTAL								65,217	35,000		73,395	91	138,612	16,108	2,602,000	0.6191
REEVE ALEUTIAN AIRWAYS INC	121	121	B-727-22C	0	9	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	L-188-C	0	28	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	L-188-C	0	43	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	B-727-22C	0	44	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	B-727-22C	0	46	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	B-727-22C	0	48	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	B-727-22C	0	50	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	B-727-22C	0	56	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	B-727-22C	0	58	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	L-188-C	0	58	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	L-188-C	0	60	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	B-727-22C	0	66	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	L-188-C	0	66	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	L-188-C	0	68	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	L-188-C	0	73	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	L-188-C	0	84	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	L-188-C	3	86	258	9	55,900	45,000	5,485	94,365	117	150,265			
REEVE ALEUTIAN AIRWAYS INC	121	121	B-727-22C	0	104	0	0	0	0	5,485	0	0	0			
REEVE ALEUTIAN AIRWAYS INC	121	121	B-727-22C	2	110	220	6	47,667	30,000	5,485	62,910	78	110,577			
SUBTOTAL								103,567	75,000		157,275	195	260,842	30,336	29,319,000	0.1035
RENOWN AVIATION INC	121	121	CV-440-440	1	50	50	1	10,833	5,000	5,485	10,485	13	21,318	2,476		
RENOWN AVIATION INC	121	121	CV-340-580STC	2	50	100	2	21,667	10,000	5,485	20,970	26	42,637	4,953		
RENOWN AVIATION INC	121	121	CV-440-580STC	1	50	50	1	10,833	5,000	5,485	10,485	13	21,318	2,476		
RENOWN AVIATION INC	121	121	L-188-A	1	99	99	2	21,450	10,000	5,485	20,970	26	42,420	4,928		
SUBTOTAL								64,783	30,000		62,910	39	127,693	14,794	1,303,000	1.1354
RYAN INTERNATIONAL AIRLINES INC	121	121	B-727-243	1	59	59	2	12,783	10,000	5,485	20,970	26	33,753	3,926		
RYAN INTERNATIONAL AIRLINES INC	121	121	B-727-231	1	66	66	2	14,300	10,000	5,485	20,970	26	35,270	4,102		
RYAN INTERNATIONAL AIRLINES INC	121	121	B-737-200	2	122	244	6	52,867	30,000	5,485	62,910	78	115,777	13,456		
RYAN INTERNATIONAL AIRLINES INC	121	121	A-320-231	1	179	179	4	38,783	20,000	5,485	41,940	52	80,723	9,380		
RYAN INTERNATIONAL AIRLINES INC	121	121	A-320-232	1	179	179	4	38,783	20,000	5,485	41,940	52	80,723	9,380		
RYAN INTERNATIONAL AIRLINES INC	121	121	DC-10-10	2	380	760	16	164,667	80,000	5,485	167,760	208	332,427	38,621		
SUBTOTAL								322,183	170,000		356,490	520	678,673	78,943	205,183,000	0.0385

Regulatory Flexibility Determination - Small Entities Potentially Affected by SNPRM

SHUTTLE AMERICA CORPORATION	121	121	DHC-8-311	6	50	300	6	65,000	30,000	5,485	62,910	78	127,910	14,858	4,338,104	0.3427

Regulatory Flexibility Determination - Small Entities Potentially Affected by SNPRM

A/C Operator Name	Operator FAR	FAR DAR T_NUM	ACFT MMS CD DS	Number of Aircraft	Max Passenger Seats	Total Passenger Seats	Total F/A Seats	Passenger Seat Cost Costs	F/A Seat Cost Costs	F/A Seat Unit Costs	Total F/A Seat Costs	... Wt. Costs (ann.)	Total Seat Costs	... Costs (Annual)	Ann. Oper. Rev.	Ann. Costs % of Ann. Oper. Rev.
SIERRA PACIFIC AIRLINES INC	121	121	B-737-2T4	1	100	100	2	21,667	10,000	5,485	20,970	26	42,637	4,953		
SIERRA PACIFIC AIRLINES INC	121	121	B-737-2T4	1	122	122	3	26,433	15,000	5,485	31,455	39	57,888	6,728		
SUBTOTAL								48,100	25,000		52,425	65	100,525	11,681	6,549,000	0.1784
SKY TREK INTERNATIONAL AIRLINES INC	121	121	B-727-276	1	172	172	4	37,267	20,000	5,485	41,940	52	79,207	9,205		
SKY TREK INTERNATIONAL AIRLINES INC	121	121	B-727-251	1	172	172	4	37,267	20,000	5,485	41,940	52	79,207	9,205		
SKY TREK INTERNATIONAL AIRLINES INC	121	121	B-727-260	1	173	173	4	37,483	20,000	5,485	41,940	52	79,423	9,230		
SKY TREK INTERNATIONAL AIRLINES INC	121	121	B-727-251	2	168	336	8	72,800	40,000	5,485	83,880	104	156,680	18,209		
SUBTOTAL								184,817	100,000		209,700	260	394,517	45,848	12,907,000	0.3562
SOUTHEAST EXPRESS AIRLINES INC	121	121	DC-9-30	4	105	420	12	91,000	60,000	5,485	125,820	156	216,820	25,210	NA	NA
SUN COUNTRY AIRLINES INC	121	121	B-727-200	13	182	2,366	52	512,633	260,000	5,485	545,220	676	1,057,853	122,914		
SUN COUNTRY AIRLINES INC	121	121	DC-10-15	4	380	1,520	32	329,333	160,000	5,485	335,520	416	664,853	77,242		
SUBTOTAL								841,967	420,000		880,740	1,092	1,722,707	200,156	269,030,000	0.0744
SUN PACIFIC INTERNATIONAL INC	121	121	B-727-227	0	100	0	0	0	0	5,485	0	0	0	0		
SUN PACIFIC INTERNATIONAL INC	121	121	B-727-214	0	100	0	0	0	0	5,485	0	0	0	0		
SUN PACIFIC INTERNATIONAL INC	121	121	B-727-227	0	150	0	0	0	0	5,485	0	0	0	0		
SUN PACIFIC INTERNATIONAL INC	121	121	B-727-214	0	150	0	0	0	0	5,485	0	0	0	0		
SUN PACIFIC INTERNATIONAL INC	121	121	B-727-214	1	172	172	4	37,267	20,000	5,485	41,940	52	79,207	9,205		
SUN PACIFIC INTERNATIONAL INC	121	121	B-727-227	2	173	346	8	74,967	40,000	5,485	83,880	104	158,847	18,459		
SUBTOTAL								112,233	60,000		125,820	156	238,053	27,664	17,115,000	0.1616
SUNBIRD AIRWAYS INC	121	121	B-727-225	2	149	298	6	64,567	30,000	5,485	62,910	78	127,477	14,808	NA	NA
SUNWORLD INTERNATIONAL AIRLINES INC	121	121	B-727-251	2	167	334	8	72,367	40,000	5,485	83,880	104	156,247	18,159	17,461,000	0.1040
TIE AVIATION INC	121	121	SD-3-60	2	36	72	2	15,600	10,000	5,485	20,970	26	36,570	4,252	NA	NA
TRADEWINDS AIRLINES INC	121	121	L-1011-385115	2	345	690	14	149,500	70,000	5,485	146,790	182	296,290	34,419		
TRADEWINDS AIRLINES INC	121	121	L-1011-3851	2	345	690	14	149,500	70,000	5,485	146,790	182	296,290	34,419		
SUBTOTAL								299,000	140,000		293,580	364	592,580	68,839	17,490,000	0.3936
UFS INC	121	121	BAE-ATP-ATP	0	64	0	0	0	0	5,485	0	0	0	0	43,062,000	0.0000

Regulatory Flexibility Determination - Small Entities Potentially Affected by SNPRM

Air_Operator_Name	Operator_FAR	FAR_PART_NUM	ACFT_MMS_CODE	Number of Aircraft	Max Passenger Seats	Total Passenger Seats	Total Flight Attendant Seats	Passenger Seat Cert. Costs	Fl. Att. Seat Cert. Costs	Fl. Att. Seat Unit Costs	Total Fl. Att. Seat Costs	Fl. A. Seat Wt. Costs (avg.)	Total Seat Costs	Seat Costs [illegible]	Ann. Oper. Rev.	Ann. Costs % of Ann. Oper. Rev.
VANGUARD AIRLINES INC	121	121	B-737-222	1	122	122	3	26,433	15,000	5,485	31,455	39	57,888	6,728		
VANGUARD AIRLINES INC	121	121	B-737-2Q8	1	122	122	3	26,433	15,000	5,485	31,455	39	57,888	6,728		
VANGUARD AIRLINES INC	121	121	B-737-230	3	122	366	9	79,300	45,000	5,485	94,365	117	173,665	20,185		
VANGUARD AIRLINES INC	121	121	B-737-2T5	1	122	122	3	26,433	15,000	5,485	31,455	39	57,888	6,728		
VANGUARD AIRLINES INC	121	121	B-737-244	1	122	122	3	26,433	15,000	5,485	31,455	39	57,888	6,728		
VANGUARD AIRLINES INC	121	121	B-737-247	1	122	122	3	26,433	15,000	5,485	31,455	39	57,888	6,728		
VANGUARD AIRLINES INC	121	121	B-737-297	1	122	122	3	26,433	15,000	5,485	31,455	39	57,888	6,728		
VANGUARD AIRLINES INC	121	121	B-737-2B7	4	122	488	12	105,733	60,000	5,485	125,820	156	231,553	26,913		
SUBTOTAL								343,633	195,000		408,915	507	752,548	87,466	132,668,000	0.0659
WINAIR	121	121	B-737-200	2	136	272	6	58,933	30,000	5,485	62,910	78	121,843	14,157	12,779,000	0.1108